testimony that Ms. Ahern criticizes is not about the development of samples comparable in risk to CIWC. Rather, I was describing the discounted cash flow ("DCF") analysis, which does not require a risk analysis to implement. As shown in my direct testimony, the DCF model contains no direct measure of risk.[6]

Q. Please respond to Ms. Ahern's assertions that the article by Litzenberger, et al ("Litzenberger") cited in your direct testimony used both adjusted and unadjusted betas, contrary to your claim that it used only raw betas, and that that study does not support your claim that a beta adjustment is a solution to the discrepancy between the theoretically predicted and empirically observed relationship between risk and return.[7]

A. Ms. Ahern has misinterpreted that article. Litzenberger sets forth the empirical evidence that risk premiums are not proportional to "NYSE" betas[8] as the Capital Asset Pricing Model ("CAPM") predicts, but linear, with a positive intercept. This is Litzenberger's mathematically precise way of stating that the observed security market line, which maps the relationship between beta and return, is flatter than theory predicts. Litzenberger proceeds to discuss various ways of altering the CAPM itself or beta to bring the resulting predicted return more in line with actual results. That Litzenberger never combines adjusted betas with alternative versions of the CAPM is significant. Next, Litzenberger describes how the unadjusted (i.e., raw, or historical) betas may be used to predict risk premiums.[9] This procedure involves adjusting historical (i.e., raw) betas using the following equation:

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[6] ICC Staff Exhibit 7.00, page 11.

[7] Company Exhibit 7.0R, pages 21-22.

[8] Litzenberger often refers to raw beta as a NYSE beta. Litzenberger, Ramaswamy and Sosin, "On the CAPM Approach to the Estimation of A Public Utility's Cost of Equity Capital," *Journal of Finance*, May 1980, page 369.

$$\beta_{adjusted} = \omega \times \beta_{historical} + (1 - \omega) \times 1$$

The above adjustment, which I have applied to my raw (i.e., historical) beta estimates,[10] is known as the global adjustment approach. Litzenberger observes that if ω were constant, then the cost of equity estimates using the resulting adjusted betas would be identical to those using unadjusted betas in an empirically-derived CAPM.[11]

Q. Ms. Ahern states that "the CAPM underestimates the common equity cost rate… because it does not capture unsystematic, non-diversifiable, company-specific risk," while "company specific, unsystematic, non-market, risk is fully captured in the RPM" without overestimating the cost of capital.[12] She also states that you incorrectly assume that investors only seek compensation for market risk.[13] Is Ms. Ahern correct?

A. No. Ms. Ahern incorrectly claims that all risk, systematic and unsystematic, should be compensated in this proceeding. That claim is contrary to portfolio theory, which posits that risk can be reduced without sacrificing returns through portfolio diversification. That is a fundamental principle of finance, one for which Harry Markowitz a won Nobel prize and upon which a great deal of modern finance is built. According to portfolio theory, investors are only compensated for risk that cannot be eliminated through diversification (i.e., systematic risk). In the competitive financial market place, investors holding diversified portfolios will perceive less risk in a security than those investors who do not hold diversified portfolios. Consequently, diversified investors will place a greater value on securities than non-diversified investors; and the market clearing prices will reflect systematic risk only. *Thus, unsystematic risk is not compensated.* The Commission should not reward an investor for the additional risk he incurs by not diversifying, when he could easily eliminate that additional risk.

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[9] Litzenberger, Ramaswamy and Sosin, "On the CAPM Approach to the Estimation of A Public Utility's Cost of Equity Capital," *Journal of Finance*, May 1980, page 376.

[10] For my adjustment, ω= 0.66257, as adopted from Merrill Lynch.

[11] Litzenberger, Ramaswamy and Sosin, "On the CAPM Approach to the Estimation of A Public Utility's Cost of Equity Capital," *Journal of Finance*, May 1980, pages 376, 380.

[12] Company Exhibit 7.0R, pages 25-26.

[13] Company Exhibit 7.0R, pages 35-36.

Q. Is Ms. Ahern correct when she repeatedly asserts that analysts such as you and she should attempt to emulate investor behavior?[14]

A. Ms. Ahern is incorrect on two levels. First, even if Ms. Ahern's assertion were valid, and it is not, it implies that investor behavior is discrete, unvarying, and knowable. If true, Ms Ahern had an obligation to demonstrate that her conception of investor behavior is valid. She did not. Obviously, investor behavior has none of those traits, making attempts to emulate it unproductive. Second, investors endeavor to determine appropriate prices to pay for securities given their required rates of return. In contrast, my task is to estimate the investor-required rate of return those observable market prices imply. Different investors surely use different valuation methodologies, if any at all. For example, an investor may buy a security simply because he believes it is underpriced, without performing any fundamental analysis. Whether or not an investor applies a formal valuation methodology, one can still determine that investor's required rate of return from the price he is willing to pay through the application of financial market models.

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[14] Company Exhibit 7.0R, pages 6, 14, 16, 18, 19, 21, 26, and 27.

Q. Ms. Ahern relies on the argument that "absent evidence to the contrary…"[15] her assumptions should accepted by the Commission. Do you agree with Ms. Ahern?

A. No. Ms. Ahern's methodologies are inconsistent with financial theory. Obviously CIWC bears all burdens of proof in this proceeding, but particularly in this instance Ms. Ahern must convincingly demonstrate that her deviations from financial theory are supported with observable fact rather than the conjecture and supposition on which she relies.

Historical Data

Q. Do you agree with Ms. Ahern's criticism of spot market data and defense of historical data?

A. No. This issue was previously discussed in great detail on pages 13 and 26-29 of my direct testimony. To summarize, the market value of common stock equals the cumulative value of the expected stream of future dividends after each is discounted by the investor required rate of return. Every day new information becomes available and investors rethink their projections of future cash flows and the risk level of a company. Thus, only a current stock price will reflect all information, both historical and current, that is available and relevant to the market.

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[15] Company Exhibit 7.0R, pages 14, 17, 18, and 28.

Ms. Ahern acknowledges that DCF theory indicates that spot market prices be used in a DCF analysis, but defends her use of average historical stock prices claiming it "normalizes the effects of any market aberrations or volatility and dramatic company-specific events upon stock prices."[16] As explained in my direct testimony, the use of historical data has many shortcomings. Conversely, the only shortcoming of spot prices Ms. Ahern cites, volatility, can be mitigated through the use of samples, a technique which both Ms. Ahern and I already implement. Thus, not only is the use of historical data *inappropriate*, but the use of samples renders it *unnecessary* as well.

Q. Ms. Ahern states that "rate of return analysts…are attempting to emulate investor behavior" and "absent empirical evidence to the contrary, it is reasonable to assume that investors utilize historical data in arriving at their expectations and required returns,"[17] thus suggesting that historical data should be used. Do you agree with Ms. Ahern?

A. No. First, as explained previously, it is not the rate of return analysts' role to "emulate investor behavior," a task that would be impossible, but rather to estimate the investors' required rate of return through an analysis of the prices that investors pay. Second, I do not dispute that investors base their expectations, in part, upon historical data. Rather, I dispute the propriety of using historical data as a direct estimate of those expectations. Ms. Ahern has failed to demonstrate that investors use the same data she used, in the same manner she used it, a demonstration that her call to "emulate investors" necessitates. Finally, even if one were to incorrectly accept historical data as accurate estimators of investor expectations, their use remains problematic. Since the true historical mean is unobservable, and no universally-accepted sample historical measurement period exists, analysts cannot know if the data they select is truly representative of the data investors use.

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[16] Company Exhibit 7.0R, pages 16-17.
[17] Company Exhibit 7.0R, page 14.

Q. Ms. Ahern claims that "the average, specifically the arithmetic mean, is the best estimate of the next expected value of randomly generated data"[18] and that "using the arithmetic mean of randomly generated data, such as long-term historical stock market returns or risk premia, is...entirely appropriate for cost of capital determination."[19] Do you agree with this claim?

A. No. Ms. Ahern's use of the phrase "average mean" wrongly implies an equivalence of the sample mean she uses with the single, true population mean. Unfortunately, due to the large variance of market prices, one would need so long a time period to accurately measure the true mean that the mean most likely would have changed in the interim. Nobel prize winner Merton Miller stated:

> "as Fischer Black always reminded us, estimating variances is orders of magnitude easier than estimating the means or expected returns that are central to the models of Markowitz, Sharpe, or Modigliani-Miller. The precision of an estimate of the variance can be

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[18] Company Exhibit 7.0R, page 15.
[19] Company Exhibit 7.0R, page 16.

> improved…by cutting time into smaller and smaller units – from weeks to days to hours to minutes. For means, however, the precision of estimate can be enhanced only by lengthening the sample period, giving rise to the well-known dilemma that by the time a high degree of precision in estimating the mean from past data has been achieved, the mean itself as almost surely shifted."[20]

Furthermore, Ms. Ahern concedes that "[Mr. McNally] is correct when he states that security return movements approximate a random walk."[21] According to an econometrics textbook, "a random walk is an example of a nonstationary time series."[22] A time series is nonstationary if its mean and variance change. Hence, securities prices and returns do not have the stable mean that the use of historical data requires. Moreover, the best estimate of the next expected value in a random walk is, in fact, the last observed value,[23] rather than the historical average.

Q. Ms. Ahern claims that she did not "select" the 1928-1999 time period to develop her equity risk premium. Rather, she claims that 1928-1999 is the default time period, because that "represents all the years for which data were available."[24] Do you agree?

A. No. The 1928-1999 data is all the data Ms. Ahern chose to find. In fact, Clifford Asness uses data from as far back as the 1871.[25] Moreover, in ICC Docket 00-0340, Illinois-American Water Company witness Paul Moul used the 1926-1999,

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[20] Emphasis added, Miller, Merton H., "The History of Finance: An eyewitness account," *The Journal of Portfolio Management*, Summer 1999, page 100.

[21] Company Exhibit 7.0R, page 15.

[22] Gujarati, Damodar, N., Basic Econometrics, McGraw-Hill, 1995, page 718.

[23] Foster, George, Financial Statement Analysis, Prentice-Hall, Inc., 1978, page 83.

[24] Company Exhibit 7.0R, page 27.

[25] Asness, Clifford S., Stocks Versus Bonds: Explaining the Equity Risk Premium, *Financial Analysts Journal*, March/April 2000, page 96.

1974-1999, and 1979-1999 time periods. The fact that users of historical data cannot agree on a definitive time period demonstrates that one does not exist. Thus, any time period chosen is arbitrary and subject to manipulation. Ms. Ahern has failed to demonstrate that the measurement period she chose is appropriate.

Size Premium

Q. Ms. Ahern continues to argue that a size-based premium is warranted. Do you agree?

A. No. As discussed at length on pages 44-51 of my direct testimony, the existence of size-based premiums is highly questionable at best. For utilities, a size-based premium is clearly inappropriate. Ms. Ahern's rebuttal testimony provides no evidence to change my opinion. In defense of her size-based premium, Ms. Ahern erroneously implies that empirical evidence of a size premium is more important than a theoretical basis.[26] However, theory explains why a pattern exists. If there is a systematic reason for an observed outcome, it can be expected to continue into the future. In contrast, without theoretical underpinnings, empirical evidence cannot be presumed, much less proved, to continue into the future. One of the main problems with the size premium is that it seems to be period-specific. From 1926 to 1999, small stocks did outperform large stocks, on average. However, small stocks did not consistently and systematically outperform large stocks. During the period 1963 to 1983, small stock returns dominated large stock returns, but outside that time period, small stocks only performed as well as, if not worse than, large stocks. Such data, in addition to the "crossover effect" found by Fernholz, explained on pages 47-48 of my direct testimony, do not indicate that the size effect is anything more than a statistical anomaly.

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[26] Company Exhibit 7.0R, page 33.

Ms. Ahern also incorrectly claims that factors such as lack of liquidity and higher transactions costs increase the riskiness of small firms. Those factors increase the cost to investors; they do not increase the riskiness of a firm.

Finally, Ms. Ahern argues that just because a study does not specifically refer to utilities does not mean that the study does not apply to utilities, because "financial theory is applicable across the broad spectrum of firms and not limited to any particular industry or industries."[27] But Ms. Ahern has not demonstrated that a size premium has any theoretical basis. That is precisely the problem, and precisely why Ms. Ahern mistakenly argues that empirical data is more important than theory. Regardless, the fact that studies on size-based premiums do not specifically address utilities does matter. The average return on a sample of industries does not necessarily apply to each industry in the sample. For example, if data were found that warranted size-based premiums of 2% for the steel industry, 1% for the airline industry, and 0% for the utility industry, the average size-based premium would be 1%. Clearly, it cannot be said that the 1% average size-based premium applies to the utility industry. The only evidence Ms. Ahern has presented which relates specifically to the utility industry is an excerpt from Ibbotson Associates ("Ibbotson") Valuation Edition - 2000 Yearbook. Ms. Ahern claims that table 5-11, on page 136-137 of that publication, verifies that a size premium does apply to utilities, and thus to CIWC. Unfortunately, that study encounters the same problem as the other studies she cited. Page 134 of the Ibbotson publication states that for that study, "[i]ndustries are defined at the two-digit SIC (Standard Industrial Classification) code level." Ms. Ahern states that "the two digit SIC code for utilities is 49."[28] Thus, what Ms. Ahern would refer to as the "utility" industry, was broadly defined to include such entities as steam and air-conditioning supply companies and irrigation system companies in addition to regulated utilities. In contrast, when referring to utilities in my direct testimony, I meant specifically regulated utilities. As indicated on page 47 of my direct testimony, regulated utilities differ from other non-regulated industrial companies (even those assigned a SIC code of 49) in that the cost of obtaining information regarding smaller utilities in general, and CIWC in particular, is unlikely to be as high as that of unregulated companies that are similar in size; hence, the application of a size-based premium to a utility is highly questionable. The Ibbotson study does not prove otherwise. In contrast, the Wong article cited on page 50 of my direct testimony, applies directly to regulated utilities. Also, unlike the Wong article, the statistical significance of the results of the Ibbotson study, which Ibbotson does not present, are questionable, particularly in light of the large standard deviations of returns in SIC code 49. Finally, even if the results shown in the Ibbotson study can be appropriately applied to regulated utilities, which they cannot, it is still quite possible that the results of that study are simply a statistical anomaly, as explained above. In fact, the "crossover effect" would likely be even more pronounced in the Ibbotson study because companies were only broken down into two groups, small and large.

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[27] Emphasis added, Company Exhibit 7.0R, page 33.

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[28] Company Exhibit 7.0R, page 34.

Q. Ms. Ahern claims that you were incorrect when you stated that, if allowed, any size-based risk premium should be based upon the size of CIWC's parent, Philadelphia Suburban Corporation ("PSC"). Do you agree with Ms. Ahern?

A. No. As indicated above, and in my direct testimony, factors such as lack of liquidity and higher transactions costs increase the cost to investors; they do not increase the riskiness of a firm. Since the equity of CIWC is obtained indirectly from the investor through PSC, a much larger organization, the added costs allegedly associated with smaller companies are not incurred. PSC can pass through equity capital to CIWC without incurring the costs that market-traded companies comparable in size to CIWC are alleged to incur. The fact that potential lenders are interested in the ability of CIWC alone to service any additional debt is irrelevant, since CIWC is the sole obligor. In contrast, CIWC has only one equity investor, PSC, which incurs costs to raise equity commensurate with PSC's liquidity, not CIWC's liquidity.

Q. Ms. Ahern argues that reductions in costs resulting from efficiencies will be reflected in the operating expenses component of the revenue requirement; hence, ratepayers will not be denied the benefits associated with the combined entity's stronger financial profile.[29] Do you agree?

A. No. While it is true that operating efficiencies are reflected in the operating expenses component of the revenue requirement, capital market efficiencies are not. Thus, if efficiencies are gained, but are not reflected in the cost of capital, the ratepayers will be denied the benefits associated with the combined entity's stronger financial profile. As indicated on page 45 of my direct testimony, being a part of a much larger organization could enhance the ability of CIWC to access the market on reasonable terms. In fact, Consumers Water Company and PSC agreed to precisely that when they stated, in their joint application for approval to merge, that "the combined entity will have a stronger financial profile," which "should enhance the ability of PSC and Consumers Illinois to access the capital markets on *reasonable terms.*"[30]

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[29] Company Exhibit 7.0R, page 32.

Allegation of Exclusive Reliance on the DCF Model

Q. Please respond to Ms. Ahern's allegation that your entire analysis relies exclusively on the DCF, since the market return used in your Risk Premium model was derived through a DCF calculation.[31]

A. Once again, Ms. Ahern is mistaken. First, the market return ("R_M") used in my risk *premium model comprises over 350 different companies not used in my DCF* analysis. Thus, the samples are independent. Second, my risk premium model uses a DCF calculation only to derive R_M, one of its four inputs. Third, her criticism is disingenuous since in addition to using an historical market return, Ms. Ahern's Risk Premium and Capital Asset Pricing models also use DCF-derived market returns.[32]

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[30] ICC Docket 98-0602, Verified Application of Joint Applicants, pages 6-7.
[31] Company Exhibit 7.0R, page 3.
[32] Company Exhibit 7, pp. 36 and 42.

Since R_M is forward-looking, it can only be estimated through a DCF calculation without resorting to untimely historical data. Thus, if the Commission judges that the DCF-derived R_M should not be applied within the risk premium model, then I would have to substitute into my model a R_M derived from an historical risk premium. According to Ms. Ahern's direct testimony, the Ibbotson historical risk premium is 8.1%,[33] which added to the 5.81% U.S. Treasury bond yield would result in an R_M estimate of 13.91%. Thus, my risk premium analysis using the historical R_M would produce a cost of equity estimate of 9.46% for my Water sample and 9.21% for my Comparable sample, far below the 10.50% and 10.19% estimates I obtained with my methodology.

Q. Ms. Ahern states that the Efficient Market Hypothesis ("EMH"), the foundation of modern investment theory, presumes that "investors are aware of all publicly-available information, including…various cost of common equity methodologies." Thus, she concludes that the EMH mandates "that no single common equity cost rate model should be relied upon in determining a cost rate of common equity…" and that your "exclusive reliance upon the DCF model is at odds with the very foundation, i.e., the EMH, upon which the DCF is predicated."[34] Is her conclusion correct?

A. No. The semi-strong form of the EMH states that "security prices should reflect all information that is publicly available at any point in time" and that "the expected returns implicit in the current price of the security should reflect its risk."[35-36] However, the EMH does not make any claims regarding security pricing methodologies. That is, the EMH is concerned with the information available to investors, not how they use it. While analysts should use more than one valid common equity cost rate model in order to avoid the potential misestimates possible with any single model, the EMH does not dictate that they do so. Thus, even if my entire analysis were reliant exclusively on the DCF, which it is not, it would not be at odds with the EMH.

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[33] Company Exhibit 7, p 42.
[34] Company Exhibit 7.0R, page 3.
[35] Reilly, Frank K. and Keith C. Brown, Investment Analysis and Portfolio Management, Fifth Edition, p.

Market Value vs. Book Value

Q. Ms. Ahern claims that the R_M used in your Risk Premium model is grossly understated because the market value of the S&P500 was much higher than its book value and consequently the results of your risk premium analysis are understated.[37] Is she correct?

A. No. The fact that the market-to-book ratio of the S&P 500 Index was 496.4% at year end 1999 does not indicate that the required rate of return has increased. In fact, if it indicates anything about required rates of return, it is that they have fallen, which is supported by Federal Reserve Board Chairman Alan Greenspan's statement, "That equity premiums have generally declined during the past decade is not in dispute."[38] Ms. Ahern seems to confuse required returns on market equity with expected returns on book equity. The market value of an investment is an estimate

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210, 1997.

[36] Although evidence from tests of the semi-strong form of the EMH is mixed, I will assume, for the sake of argument, that the semi-strong form holds.

[37] Company Exhibit 7.0R, pages 5-6.

[38] Speech by Alan Greenspan before a conference sponsored by the Office of the Comptroller of the

of future earnings discounted at the required rate of return. The required rate of return is based on investors' time value of money and the assessed risk of the investment. If the required rate of return rises, all else held constant, the price of an investment will fall. Similarly, if the price of an investment has risen, all else constant, the investor required rate of return must have fallen. The market price of a common stock does not achieve equilibrium until the expected rate of return on the common stock equals the investor required rate of return.

It is interesting that Ms. Ahern should claim that the R_M I used in my Risk Premium analysis is grossly understated due to a DCF bias, since my R_M of 16.24% is higher than the implied 14.4% estimate of R_M using her historic, non-DCF, estimated risk premium of 8.1%.[39] Moreover, my R_M is still higher than her 16.2% average R_M, which includes her highly questionable prospective R_M estimate of 18.0%, (18.0% prospective and 14.4% historical, average 16.2%). Therefore her claim of a downward DCF bias is unfounded.

Q. Ms. Ahern suggests that the recent rise in stock price growth indicates that investors expect an increase in prices beyond that reflected in earnings growth. Do you agree?

Currency, Washington, D.C., October 14, 1999.

[39] Company Exhibit 7, page 42. 14.4% is the sum of the historic risk premium, which Ms. Ahern states as 8.1%, and the current risk-free rate, which Ms. Ahern states as 6.3%.

A. No. Price appreciation in excess of earnings growth does not create wealth. Rather, it is a transfer of wealth. A company creates wealth through the earnings is generates. The price an investor is willing to pay for a claim to expected earnings does not change the amount of underlying wealth. If a prospective investor is willing to pay a current shareholder more than the book value he initially paid for a security, that only transfers the claim on the wealth generated by the company from the new investor to the original stockholder. What is gained by the original shareholder in terms of price appreciation, is given up by the new investor.

Q. Please respond to Ms. Ahern's assertion that there is a "tendency of the DCF model to mis-specify investor's required return rate when the market value of common stock differs significantly from its book value."[40]

A. To address this issue, one must first explore why the market value of utility common equity exceeds book value, which Ms. Ahern has failed to do. There are two possible explanations for how utility stock prices have come to exceed their respective book values: (1) the investor-required rate of return has fallen or (2) expectations of future earnings have risen. The investor-required rate of return on an investment in a utility would fall if either the price of risk (i.e., the risk premium) has fallen or if investors' perceived level of risk in that utility has fallen. Either way, if a utility's stock price grows to exceed its book value due to a decline in investors' required rate of return for that utility, then it obviously follows that the Commission should authorize a lower rate of return.

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[40] Company Exhibit 7.0R, page 5.

An increase in investors' expectations of future returns could also cause a rise in market values over book values. Such an increase in expectations may be due to positive deviations (e.g., higher than projected sales) from the test year amounts upon which the company's rates are set. Clearly, the Commission should not approve higher rates today based on such deviations from past rate case estimates. Increased expectations of future returns may also be a function of earned returns from sources other than the revenue requirements formula component, the product of rate base and rate of return ("R_{Other}"). Earnings from these sources could allow a utility to earn returns beyond the level needed to meet investors' required rate of return. The danger in allowing a utility to earn a rate of return on equity rate base in excess of the market required rate of return on common equity becomes apparent when those other sources (R_{Other}) of value are recognized. The result is a never ending upward spiral as each successive increase in market value would lead to another increase in the allowed rate of return, which in turn, would lead to a further increase in market value.

R_{Other} can come from a number of sources. First, many utilities have unregulated sources of income that would contribute to earnings beyond the level needed to meet the required rate of return. Obviously, the Commission should not allow regulated utilities higher rates of return due to stock price increases caused by such unregulated operations. Second, the normalization of deferred income taxes and income tax credits might also contribute to the divergence between utility market and book equity values since that practice compensates utilities for taxes they do not yet owe. Finally, investors do not value utilities on the basis of accounting earnings, but on economic earnings and cash flow. In utility revenue requirements, part of cash flow comes from operating income (i.e., rate base × rate of return). The larger share of the remainder comes from operating expenses in the form of depreciation and deferred taxes. The Commission should not further increase allowed rates of return when benefits that utilities receive from other aspects of the rate setting process such as tax normalization rules and cash flow from sources such as depreciation and deferred taxes increase stock prices above book value. To do otherwise would compensate utilities twice for the same sources of cash flow.

Risk Premium Analyses

Q. Ms. Ahern claims that it is not necessary for investors to compute their own betas, as they are readily available from Value Line or Merrill Lynch. Please comment.

A. First, as explained earlier, it is not the duty of the analysts in this proceeding to emulate investors, but rather to discern investors' required rate of return based on observable market prices. Regardless, I am not aware of any financial theory which posits that it is inappropriate for an investor (or analyst) to calculate his own betas. Second, the methodology I used to estimate beta is based on that of Merrill Lynch. Third, Value Line does not publish betas for all of the companies included in my samples, whereas Staff's methodology directly measures the sample beta, incorporating all companies in my samples. Fourth, Value Line does not provide the regression statistics that are necessary for evaluating the validity of its beta estimates.

Q. Ms. Ahern criticizes your beta calculation methodology as being inconsistent with that of Value Line and Merrill Lynch because you used excess price returns in your regression while Value Line and Merrill Lynch regress total price returns.[41] Please comment.

A. Ms. Ahern is wrong. The use of "excess"[42] returns is the theoretically correct approach to measuring beta. Nevertheless, beta is often estimated from total price appreciation because that approach produces essentially the same results as using excess returns. Specifically, using excess returns, the raw betas for my water sample and comparable sample were 0.17 and 0.13, respectively, while the corresponding adjusted betas were 0.45 and 0.42, respectively. Using total price appreciation, the raw betas for my water sample and comparable sample were 0.17 and 0.12, respectively, while the adjusted betas for my water sample and comparable sample were 0.45 and 0.42, respectively.

Q. Ms. Ahern implies that adding Value Line's median total market appreciation and median dividend yield for her estimate of total market return is appropriate.[43] Do you agree?

A. No. That combination is inappropriate for the reasons outlined on pages 33-34 of my direct testimony. In defense of her estimate, Ms. Ahern again argues that rate of return analysts are to emulate investor behavior and states that "information provided by Value Line is investor influencing and should not be rejected by any rate of return analyst."[44] Ms. Ahern implies that investors wrongly combine Value Line's estimate of median price appreciation and median dividend yield as she does. First, to my knowledge, Value Line never suggests that its median total market price appreciation and dividend yield should be combined to form a market return estimate. Second, Ms. Ahern has failed to demonstrate that investors do, in fact, use Value Line data in the same flawed manner she employs.

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[41] Company Exhibit 7.0R, page 6.

[42] For the purpose of this discussion, "excess" returns refers to the portion of total returns in excess of the risk-free rate.

[43] Company Exhibit 7.0R, page 19-21.

Ms. Ahern also claims that the use of medians provides a better estimate of the central tendency of the securities in the market portfolio. First, she argues that "the median compensates for the effect that extremely high or low expected price appreciation and number of shares outstanding have on either the simple or weighted arithmetic mean." While that may be true, with a sample of almost 1,700 stocks, it is highly unlikely that a few outliers would distort the arithmetic mean. Next, Ms. Ahern claims that "[i]t is entirely, conceivable that there are a sufficient number of stocks yielding the median dividend yield that by adding those non-dividend paying stocks to the data series, the median would still be the same." According to Harold Levine, Director of Statistical Services at Value Line, of the 1,636 stocks currently under review by Value Line, 979 pay dividends, which leaves 657 non-dividend paying stocks.[45] Therefore, in order for Ms. Ahern's "entirely conceivable" scenario to actually occur, the dividend yield of at least 329 of the 979 dividend paying companies would have to equal the median value. While that may be conceivable, it is very, very unlikely. Perhaps more importantly, the fact that it is even possible that 657 observations with a value of zero could be added to a sample without the median changing, demonstrates that the median, at least in this instance, is a very poor measure of central tendency.

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[44] Company Exhibit 7.0R, page 19.
[45] The telephone conversation with Mr. Levine occurred on October 17, 2000.

Q. Ms. Ahern argues that while you "correctly, and commendably, adjusted [your] calculated raw betas, [you] did so for the wrong reason"[46] since a beta adjustment does not correct for the observed flatness in the linear relationship between risk and return. Do you agree?

A. No. Ms. Ahern's claim is based on the misguided notion that an adjustment to beta and an adjustment to the CAPM model are discrete, unrelated adjustments. Her only support for this claim comes from Dr. Roger Morin, who incorrectly argues that the difference between an adjustment to beta and an adjustment to the CAPM model is that the Empirical Capital Pricing Model ("ECAPM") is a required return (Y-axis) adjustment and the beta adjustment is a risk (X-axis) adjustment.[47] However, the mathematical effect of either adjustment is identical. As such, any adjustment to beta along the X-axis results in a corresponding change to the return along the Y-axis. Thus, the beta adjustment does correct for the observed flatness in the linear relationship between risk and return.

The Security Market Line ("SML") shows the linear relationship between the required rate of return on a security (R_j, on the Y-axis) and beta (on the X-axis).

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[46] Company Exhibit 7.0R, page 8.
[47] Company Exhibit 7.0R, Schedule 4, page 4.

Theoretically, the intercept of the SML is the risk-free rate, R_f, and the slope is the market risk premium ($R_M - R_f$).

Ms. Ahern's ECAPM adjusts the CAPM as follows:

$$R_j = R_f + 0.25 \times (R_m - R_f) + 0.75 \times \beta_j \times (R_m - R_f)$$

This adjustment results in a higher intercept (i.e., $R_f + 0.25 \times (R_m - R_f)$) and a flatter slope (i.e., $0.75 \times (R_m - R_f)$). The Value Line beta adjustment also flattens the slope of the SML, only moreso:[48]

$$R_j = R_f + (0.35 + 0.67 \times \beta_j) \times (R_m - R_f)$$

The CAPM equation above, incorporating the Value Line beta adjustment, increases the intercept of the SML from R_f to $R_f + 0.35 \times (R_m - R_f)$ and reduces the slope from $R_m - R_f$ to $0.67 \times (R_m - R_f)$. Presumably, that is why it was correct and commendable for me to make the adjustment I made. However, a second adjustment is neither necessary nor warranted. I do not dispute the necessity of either the ECAPM type or beta adjustment in isolation. I only dispute the appropriateness of using the two in conjunction with one another.

Q. Ms. Ahern denies that her beta adjusted Risk Premium model is a CAPM derivation. Is she correct??

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[48] The Merrill Lynch beta adjustment I employ, $\beta_{adjusted} = 0.33743 + 0.66257 \times \beta$, is very similar to the Value Line adjustment of $\beta_{adjusted} = 0.35 + 0.67 \times \beta$.

A. No. Ms. Ahern claims that her risk premium model ("RPM") is distinct from the CAPM and both are recognized by the "financial literature." The "financial literature" does recognize risk premium analysis, but not as Ms. Ahern has implemented it. As shown in my direct testimony,[49] Ms. Ahern's RPM analysis is an average of two distinct models. The first model can be reduced to the following equation:

$$R_j = R_{A2} + \beta_j \times (R_m - R_{Aa/Aaa})$$

In comparison, the CAPM is expressed as:

$$R_j = R_f + \beta_j \times (R_M - R_f)$$

These two models are exactly the same, except that Ms. Ahern's model substitutes for the risk-free rate the yield on A2 rated debt in one place and a mixture of yields on Aa- and Aaa-rated debt in another. Thus, the first of the two models averaged in Ms. Ahern's RPM analysis, is, in fact, a CAPM derivation, in which Ms. Ahern *improperly applies a market risk beta to a non-market risk premium and* inappropriately incorporates two different long-term corporate bond yields as substitutes for the risk-free rate.

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[49] ICC Staff Exhibit 7.00, pages 37-38.

Q. Ms. Ahern claims that your "algebraic manipulations" needlessly complicate her RPM and demonstrate your misunderstanding of the model.[50] Do you agree with her characterization?

A. No. The logic of mathematics cannot be manipulated. My "algebraic manipulations" simply describe Ms. Ahern's methodology, step by step, exactly as she implemented it. Ms. Ahern claims that what I defined as R_{A2} is actually equal to 6.8%. She is incorrect. R_{A2}, as indicated on page 37 of my direct testimony, represents Ms. Ahern's estimated prospective yield on bonds rated A2 by Moody's, which Ms. Ahern acknowledges equals 8.3%,[51] just as I explained in my direct testimony. The R_{Other} referred to on pages 40-41 of my direct testimony, which is used to derive the market equity risk premium, represents a general case, for which $R_{Aa/Aaa}$ is substituted in Ms. Ahern's model.[52] This $R_{Aa/Aaa}$, as it applies to Ms. Ahern's model, is equal to the average of Ms. Ahern's estimates of the historical return on long-term high grade (i.e., Aaa/Aa) bonds of 5.9% and the prospective yield on Aaa-rated corporate bonds of 7.7%, which, Ms. Ahern acknowledges equals 6.8%,[53] just as I explained in my direct testimony. My "algebraic manipulation" of her model simply breaks her complex model into its parts and demonstrates that when $R_{A2} \neq R_{other}$, as is the case in Ms. Ahern's model (8.3% ≠ 6.8%), then the model will not produce identical returns for two securities with identical risk, which violates a fundamental financial principle. Those same mathematics also demonstrate that whenever R_{A2} is greater than R_{Other}, as is the case in Ms. Ahern's model (8.3% > 6.8%), then the model will systematically overestimate the cost of equity for companies with a beta less than one, which includes every company in Ms. Ahern's proxy groups.

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[50] Company Exhibit 7.0R. page 26.
[51] Company Exhibit 7.0R. page 26.
[52] ICC Staff Exhibit 7.00, Schedule 7.10.
[53] Company Exhibit 7.0R. page 26.

Ms. Ahern's DCF Analysis

Q. In response to your criticism of her DCF estimate stemming from missing Value Line earning per share ("EPS") estimates, Ms. Ahern argues that it is reasonable to assume that the values of the missing data were equal to the average of the available data.[54] Do you agree with her assumption?

A. No. First, Ms. Ahern erroneously claims that there is no evidence to suggest that the missing estimates would be any lower than the average of the other estimates. As explained in my direct testimony, a comparison of the Value Line Data with the IBES Projected Five Year EPS Growth Rates for the companies in her samples reveals that the companies with missing estimates have among the lowest IBES projected EPS growth rates. While that is not conclusive proof that Value Line would also project lower growth for the companies with missing estimates than the average of the other Value Line estimates, it is very persuasive evidence. Of course, we will never know, which is why the missing Value Line growth rates should not be assumed to equal the average of the existing Value Line growth rates.

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[54] Company Exhibit 7.0R, page 17.

Second, Ms. Ahern states that "for the majority of companies in both proxy groups for whom Value Line projected growth in EPS are available, the Value Line growth rates are higher than the I/B/E/S growth rates."[55] That statement is irrelevant and illogical. Ms. Ahern averaged the estimates for both proxy groups by source (i.e., IBES EPS forecast or Value Line EPS forecast) and "assumed that the missing *growth rates are equal to the averages for each group."*[56] *That is, she assumed that* the missing Value Line estimates equal the average of the available Value Line estimates. Thus, as indicated above, the critical issue is the relative size of the individual estimates from a single source, not across sources. Even if the Value Line EPS estimate for every single company were higher than the corresponding IBES EPS estimate, the fact that the missing Value Line estimates correspond to the lowest IBES estimates indicates that they would likely be among the lowest of the Value Line estimates as well. Therefore, since Ms. Ahern averaged the estimates for both proxy groups by estimate type, the proxy group averages of Value Line EPS estimates are likely overstated.

Third, Ms. Ahern claims that given my comment that smaller companies tend to have greater growth potential, it is "entirely possible" that the missing estimates would be higher than the average of the available estimates. The statement to which Ms. Ahern refers was in reference to the life-cycle of firms in general, not to utilities that are well past the growth stage. And although it is still "entirely possible" that the missing estimates would be higher than the average of the available estimates, the only evidence available (i.e., the corresponding IBES estimates) indicates that the opposite is true. Certainly the upper end estimates of her growth rate ranges and, thus, the midpoint of those ranges are questionable.

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[55] Company Exhibit 7.0R, page 17.
[56] Company Exhibit 7.0R, page 17.

Finally, Ms. Ahern states that no real conclusions can be drawn regarding the value *of the missing estimates and, since the companies were selected on the basis of* similar risk, it is reasonable to assume that the missing estimates equal the average for each proxy group. Ms. Ahern erroneously equates risk and growth. The two concepts are only tangentially related, in that growth is partly a function of expected return on new investment, which in turn, is partly a function of risk. However, growth is also a function of dividend policy, which has no direct relationship to risk. Nevertheless, I agree that no definitive conclusions can be drawn, which is precisely what reduces Ms. Ahern's supposed average Value Line EPS growth estimate to the level of conjecture and why it should be disregarded.

Q. Do you agree with Ms. Ahern's claim that your statement that the "R" component of the BR+SV growth method is to be limited to future investment is incorrect?[57]

A. No. Ms. Ahern is not necessarily wrong in using the return on all equity to represent "R", but in doing so, she implicitly makes an assumption that she never proved to be valid: that the return on new equity investment equals the return on existing equity. Morin, who Ms. Ahern cites as an authority on this issue, reveals that the growth in earnings is based on future equity. In Morin's example, new investment is in the form of earnings reinvested in the company. The return on the original equity base is not growing at all, staying constant at $10 each year. In other words, if the company continued to earn the same return on its existing equity, but had no new investment (including retained earnings), it could not grow. It is only the return on the new investment that can be sustained. It has been demonstrated mathematically that the "R" component of the BR+SV method, as stated in my direct testimony, should be based upon future investment only.[58]

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[57] Company Exhibit 7.0R, page 18.

Ms. Ahern's Comparable Earnings Model Analysis

Q. Do you agree with Ms. Ahern's repeated assertion that her comparable earning model ("CEM") analysis is market-based because "the selection of non-price regulated firms of comparable risk is based upon statistics derived from the market prices paid by investors"?[59]

A. No. Whether or not the sample selection method is based upon market prices is irrelevant, since Ms. Ahern's CEM results are based upon accounting returns, which are unresponsive to market forces, rather than market returns. As such, the CEM fails to measure investor return requirements, which are reflected in securities prices. In contrast, the EMH, which Ms. Ahern considers "the foundation of modern investment theory,"[60] relates to securities returns, not accounting returns.

Q. In response to your argument that the return estimated by the comparable earnings analysis can be significantly distorted by accounting practices, Ms. Ahern claims that "different accounting practices also affect the growth rate component, projected or historical, of the DCF model" and that "because the criteria used to select the non-utility companies in my application of the CEM are based upon total risk, i.e., the sum of non-diversifiable, market, risk and diversifiable, non-market or company-specific, risk, all impacts of accounting differences have been obviated."[61] Please comment.

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[58] ICC Docket No. 95-0031, Direct Testimony of Dr. Charles M. Linke, Exhibit 8, pages 9-23.
[59] Company Exhibit 7.0R, page 29.
[60] Company Exhibit 7.0R, page 3.

A. Neither of Ms. Ahern's comments refute my argument. Ms. Ahern's first rationalization does not dispute my claim, but rather, implies that the same problem occurs in the DCF model, which we both utilize. This implies that accounting differences should be overlooked. However, the companies in both of my samples are all regulated utilities and, therefore, are required to employ similar accounting practices. Hence, my DCF analysis is not affected by differing accounting practices as Ms. Ahern's CEM analysis may be.

The second rationalization asserts that because her CEM proxy groups were chosen based upon statistics derived from market prices, her CEM analysis is market-based. As previously discussed, that is simply not true. The cost of equity results must be linked to risk and market prices. As Ms. Ahern acknowledges,[62] the results of her CEM analysis are based upon accounting returns, which are not directly related to required market returns. Hence, her sample selection methodology does not obviate the impact of accounting differences.

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[61] Company Exhibit 7.0R, pages 28-29.
[62] Company Exhibit 7, page 44.

Q. In response to your criticism her CEM analysis, Ms. Ahern claims that, "using Mr. McNally's logic, [American States Water Co. and American Water Works Co.] should not be part of the same sample group because they are not of similar risk,"[63] based on the difference in their betas. Please comment.

A. Unfortunately, Ms. Ahern was not using my logic. Ms. Ahern's CEM results are based upon the average accounting returns of two proxy groups, which are meant to represent the two samples she uses as surrogates for CIWC. However, the average betas of Ms. Ahern's two CEM proxy groups exceed those of the sample groups they are supposed to represent by 0.10 and 0.11. Even if accounting book returns were reasonable proxies for investor-required returns, and they are not, since the risk levels of the CEM proxy groups are higher than those of the sample groups used as surrogates for CIWC, the book returns of the CEM proxy groups would overstate the expected book returns of the sample groups used as surrogates for CIWC.

Somehow, Ms. Ahern extrapolated from my observation about the difference in risk between Ms. Ahern's CEM proxy groups and the CIWC surrogates that no two companies whose betas differ by 0.10 or 0.11 should be allowed in the same sample group. My argument, however, has nothing to do with the range of individual company betas within the groups. Individual company betas are very unreliable. Fortunately, beta estimates can be greatly improved through the use of portfolios (i.e., samples). Therefore, differences in individual company betas are of far less significance than differences in sample betas.

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[63] Company Exhibit 7.0R, pages 30-31.

Cost of Common Equity Range

Q. Ms. Ahern claims that your range of common equity cost provides an insufficient risk premium over and above the cost of public utility debt, as measured several different ways.[64] Is her claim correct?

A. No. My cost of common equity ranges from 9.9% to 10.4%, with a midpoint of 10.15%. At the time my equity analysis was performed, the yield on A-rated public utility long-term debt was 8.13%. Thus my cost of equity range produces a risk premium ranging from 1.77% to 2.27%, with a midpoint of 2.02%, which is reasonable given the general decline in equity risk premiums over the last decade. Furthermore, my cost of capital recommendation implies a pre-tax interest coverage ratio of 3.13x to 3.24x, with a midpoint of approximately 3.18x for CIWC. That is well within the guidelines that Standard & Poor's ("S&P") has established for an A rating, which is indicative of a company with a strong financial position. Moreover, the midpoint is also above the mean and median values for A-rated water utilities of 2.81x and 2.89x, respectively.[65] It is important to note that, despite Ms. Ahern's claim, S&P does not require that utilities with a business profile of 3 have a pre-tax interest coverage ratio of 2.8 for an A rating.[66] The actual pre-tax interest coverage ratios of A-rated water utilities' credit ratings makes this evident. For example, United Waterworks has been assigned an A rating and a business profile of 3, although its pre-tax interest coverage ratio was only 2.0.[67, 68] E'Town

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[64] Company Exhibit 7.0R, pages 8-9.

[65] Standard & Poor's, *Financial Medians Water Utilities*, *http://www.ratingsdirect.com*, July 7, 2000.

[66] Standard and Poor's assigns business profiles on a scale of 1-10, with 1 being the least risky and 10 being the most risky.

[67] Standard & Poor's, *Utility & Perspectives*, October 23, 2000, page 11.

Corp. has been assigned a higher rating of A+ with a riskier business profile of 4, although its pre-tax interest coverage ratio was only 2.5. Despite Ms. Ahern's claim, there is no reason to believe that if CIWC were assigned a business profile, it would be any higher than 3. Most of the water companies assigned business profiles by S&P have business profiles of 3.[69] Of the companies in my water sample that have been assigned business profiles by S&P, none has a business profile greater than 3. In fact, CIWC's parent company, PSC, has a superior business profile of 2.

Ms. Ahern incorrectly estimated my risk premium by using several different inappropriate proxies for the cost of A-rated public utility long-term debt. First, she used the yield on A-rated public utility bonds as of September 15, 2000.[70] My analysis was conducted as of August 9th, not September 15th.[71] It is inappropriate to update a single part of a complex analysis and to mismatch yields from different times. Second, Ms. Ahern used the yield on Baa-rated public utility bonds because she claims that I acknowledged that CIWC is riskier than A-rated utilities. As explained earlier, Ms. Ahern mischaracterized my testimony in which I indicated that the relevant risk premium for CIWC is a comparison between CIWC's equity and the yield on A-rated utility debt. Third, Ms. Ahern incorrectly used CIWC's embedded cost of debt, which reflects interests rates that CIWC locked into as long ago as 1983, rather than a current rate of interest. CIWC's embedded cost of debt

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[68] Standard & Poor's, *Credit Stats: Water Utilities*, *http://www.ratingsdirect.com*, September 14, 2000.
[69] Standard & Poor's, *Utility & Perspectives*, October 23, 2000, pages 11-13.

[70] Company Exhibit 7.0R, page 8.
[71] The yield on A-rated public utility bonds has, since September 15, 2000, declined to 8.10%. *Moody's Long-Term Corporate Bond Yield Averages*, Moody's Investors Service, www.moodys.com, October 25, 2000.

includes the following debt series, which were issued in the past at higher rates than available today: 10.4% Series M, 9.69% Series N, 9.19% Series P, 12.75% Series H, and 9.19% Series I. Increasing CIWC's allowed rate of return on equity in order to increase its interest coverage of embedded cost debt would doubly penalize CIWC's customers for CIWC's remaining high-cost debt.

After incorrectly estimating the risk premium implied by my analysis, Ms. Ahern *inappropriately compared that risk premium to a beta-adjusted risk premium* ($\beta \times (R_m - R_f)$) of 4.69%. That is inappropriate because she is comparing the premium implied by my cost of equity estimate in relation to A-rated public utility debt yields to the premium implied by my cost of equity estimate in relation to the risk-free rate. An equity risk premium measured relative to risky A-rated public utility debt will always be smaller than an equity risk premium measured relative to the risk-free rate.

Q. Ms. Ahern claims that your recommendation is inappropriate because it does not reflect the higher risk of CIWC relative to your proxy groups. Do you agree?

A. No. I did not include an adjustment to the cost of equity of my proxy groups because I do not believe one is necessary. As stated on pages 24-25 of my direct testimony, my analysis of the risk of CIWC as compared to that of my two proxy groups indicates that the risk of CIWC is equal to, or slightly less than, the risk of both my comparable sample and my water sample.

My analysis of the risk of CIWC relative to that of my two proxy groups is based on principal components scores. My principal components analysis distills 12 financial and operating ratios into four risk factors for CIWC and each company in my samples, as explained on pages 8-9 of my direct testimony. The results are shown on ICC Staff Exhibit 7.00, Schedule 7.04. Factors 1 through 4 measure financial risk, construction risk, operating risk, and risk associated with the level of capital intensity, respectively. For Factors 1, 2, and 3, a higher score indicates less relative risk. However, the relative risk indicated by Factor 4, capital intensity, must be analyzed in relation to the corresponding Factor 3 score. High capital intensity can indicate high barriers to entry for potential competitors, which would reduce risk, or a high level of operating leverage, which would increase risk. Higher capital intensity associated with lower operating risk (Factor 3), suggests that the barrier to entry effect predominates. Conversely, higher capital intensity associated with higher operating risk, suggests that the operating leverage effect predominates. A review of the factor scores indicates that: CIWC has less financial risk than my water sample but slightly more financial risk than my comparable sample; CIWC has significantly less construction risk than my water sample and slightly less construction risk than my comparable sample; and CIWC has more operating risk than my water sample but less operating risk than my comparable sample. Finally, CIWC has greater risk from capital intensity than my water sample, as its higher relative capital intensity leads to higher operating risk. In contrast, CIWC has lower risk from capital intensity than my comparable sample, since the barriers to entry effect predominates. The table below summarizes the risk implications of each of the Factor scores of CIWC relative to my water sample and comparable sample.

	Factor 1	Factor 2	Factor 3	Factor 4
CIWC vs. Comparable Sample	More risky	Less risky	Less risky	Less risky
CIWC vs.				

Water Sample	Less risky	Less risky	More risky	More risky

The factor scores indicate that the overall risk of CIWC is equal to, or slightly less than, the risk of both my comparable sample and my water sample. Therefore, no risk adjustment is necessary to the cost of common equity estimates for either sample.

Conclusion

Q. Please summarize your overall cost of capital recommendation.

A. After adjusting my capital structure to reflect the effects of the proposed $3,000,000 equity issuance, my overall cost of capital for CIWC ranges from 9.17% to 9.43%, with a midpoint of 9.30%. This is based on a cost of equity ranging from 9.9% to 10.4%, with a midpoint of 10.15%.

Q. Does this conclude your rebuttal testimony?

A. Yes, it does.

Docket Nos. 00-0337/00-0338/00-0339 Consolidated
ICC Staff Exhibit 14.00
Schedule 14.01

Consumers Illinois Water Company

Weighted Average Cost of Capital
Average for 2001 Test Year

Company Proposal

	Amount	Percent of Total Capital	Cost	Weighted Cost
Short-term Debt	$2,420,833	2.95%	7.24%	0.21%
Long-term Debt	37,471,705	45.62%	8.58%	3.91%
Preferred Stock	398,777	0.49%	5.52%	0.03%
Common Equity	41,854,118	50.95%	11.00%	5.60%
Total Capital	$82,145,433	100.00%		
Weighted Average Cost of Capital				**9.76%**

Staff Proposal

	Amount	Percent of Total Capital	Cost	Weighted Cost
Short-term Debt	$2,420,833	2.77%	7.57%	0.21%
Long-term Debt	$39,675,789	45.42%	8.48%	3.85%
Preferred Stock	$398,777	0.46%	5.52%	0.03%
Common Equity	$44,854,118	51.35%	9.9-10.4%	4.91-5.16%
Total Capital	$87,349,517	100.00%		
Weighted Average Cost of Capital				**9.17-9.43%**